

## FIREPLACE ASSEMBLY COVER PANELS

### CROSS REFERENCE TO RELATED APPLICATIONS

- [0001] The present application is a continuation-in-part application of U.S. Patent Application No. 10/411,780 filed on April 11, 2003, entitled DIRECT VENT FIREPLACE INSTALLATION, which is incorporated herein by reference thereto.

### TECHNICAL FIELD

- [0002] The present invention is directed to fireplace assemblies, and more particularly, toward fireplace assemblies having one or more cover panels that cover an opening in a fireplace housing.

### BACKGROUND

- [0003] It is known in the art to use glass, including tinted glass, to cover the opening in fireplaces. The tinted glass can provide an aesthetically attractive covering over the fireplace opening that may obscure the view of the fireplace interior when there is no fire burning in the fireplace and may allow a person to view into the fireplace when there is a fire burning inside the fireplace. One attribute of tinted glass, however, is that the light transmission characteristics for a given path through the glass is independent of the direction the light travels. For example, the transmission characteristics for light traveling through the glass in one direction are the same as for light traveling through the glass in the opposite direction. Accordingly, the tinted glass that is dark enough to generally hide components in the fireplace when no fire is burning may obscure the person's view into the fireplace when a fire is burning, or the tinted glass may significantly impact the appearance of a fire burning in the fireplace.

## SUMMARY OF INVENTION

[0004] The present invention overcomes limitations of the prior art and provides additional benefits. A brief summary of embodiments and aspects of the invention are presented. Thereafter, a detailed description of the illustrated embodiments is presented, which will permit one skilled in the relevant art to understand, make, and use aspects of the invention. One skilled in the art can obtain a full appreciation of aspects of the invention from the subsequent detailed description, read together with the figures, and from the claims, which follow the detailed description.

[0005] The present invention is directed at a fireplace assembly having a fireplace housing with an interior fire containment area and an opening in communication with the fire containment area. At least a portion of the opening can be covered by a cover panel. The cover panel can be configured such that it provides apparently varying visual characteristics from exterior to the fireplace housing depending upon whether there is or is not a fire burning in the fireplace.

[0006] In one embodiment of the invention, the cover panel can be configured to have a first transmittance therethrough in a first direction and a second transmittance therethrough in a second direction. The second transmittance can be greater than the first transmittance. In one aspect the invention, a half-silvered layer, such as used in a one-way mirror, can be incorporated in or on the cover panel to provide the first and second transmittances. In another aspect of the invention, a single coating or multiple coatings covering portions of the cover panel may be used to provide the first and second transmittances. In yet another aspect of the invention, the cover panel can be constructed of various layers of different materials to achieve the first and second transmittances.

[0007] In another embodiment of the invention, the cover panel is configured to allow a visual characteristic of the cover panel to be adjustable, there being a first visibility that substantially prevents a person in an area exterior to the fireplace housing from clearly seeing through the cover panel into the fire area and a

second visibility that allows the person in an area exterior to the fireplace housing to see through the cover panel into the fire area with greater visibility. In one aspect of the invention, the visibility adjustment can be dependent on the cover panel being exposed to varying amounts of heat.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Figure 1A is a front elevation view of a direct vent fireplace unit in a corner-mounted furniture unit.

[0009] Figure 1B is a side elevation view of one embodiment of the furniture unit and fireplace unit of Figure 1A.

[0010] Figure 2 is a partial front elevation view of a direct vent fireplace unit in a furniture unit in accordance with an alternate embodiment of the invention.

[0011] Figure 3 is an exploded, partial front isometric view of the fireplace unit and the furniture unit of Figure 1A.

[0012] Figure 4 is an enlarged isometric view of the direct vent fireplace unit of Figure 1A shown removed from the furniture unit.

[0013] Figure 5 is an enlarged cross-sectional view of the direct vent fireplace unit taken substantially along lines 5-5 of Figure 4.

[0014] Figure 6 is an enlarged isometric view of a contoured surround shown removed from the fireplace unit of Figure 4.

[0015] Figure 7 is an isometric view of a wall-mounted, direct vent fireplace unit shown in a wall above the ground in accordance with an alternate embodiment of the invention.

[0016] Figure 8 is an isometric view of a fireplace assembly in accordance with an alternate embodiment of the invention with a fire burning in the fire containment area.

[0017] Figure 9 is an isometric view of the fireplace assembly of Figure 8 when a fire is not burning in the fire containment area.

## DETAILED DESCRIPTION

[0018] Fireplace assemblies with cover panels having selected visual characteristics are described in detail herein in accordance with embodiments of the present invention. In the following description, numerous specific details are discussed to provide a thorough and enabling description for embodiments of the present invention. One skilled in the relevant art, however, will recognize that the invention can be practiced without one or more of the specific details. In other instances, well-known structures or operations are not shown, or are not described in detail to avoid obscuring aspects of the invention. In general, alternatives and alternate embodiments described herein are substantially similar to the previously described embodiments, and common elements are identified by the same reference numbers.

[0019] Figure 1A is a front elevation view of a furniture-mounted fireplace installation 10 in accordance with one embodiment of the present invention. The illustrated furniture-mounted fireplace installation 10 includes a fireplace unit 12 mounted in a furniture unit 14. The illustrated fireplace unit 12 is a self-contained, direct vent fireplace insert coupled to a fuel gas source 16. The fireplace unit 12 is configured to provide heat into the room in which the fireplace installation 10 is located when the fireplace unit is activated, while also providing very aesthetically pleasing fire framed by the furniture unit 14. The fireplace unit 12 fits seamlessly within the furniture unit 14 and provides a very attractive addition to a room or an outside area. The fireplace unit 12 has a panel of glass 66 across the front that has a first visual characteristic that permits a person to see into the fireplace unit when a fire is burning therein, and a different second visual characteristic that substantially blocks visibility into the fireplace unit when no fire is burning.

[0020] The furniture unit 14 illustrated in Figure 1A is a movable corner-mounted highboy having an upper portion 18 and a lower portion 20. The front side 22 of the furniture unit 14 faces into a room 24 or the like, and the backside 26 is shaped and sized to correspond to a corner 28 of the room 24. The furniture unit

14 is configured to support and contain the fireplace unit 12 in the upper portion 18 above the ground 30 and above the furniture unit's lower portion 20. It is to be understood that the ground 30 can be a floor, a foundation, the earth, or other support surface on which the furniture unit 14 is positioned. The lower portion 20 of the illustrated furniture unit 14 includes a display area 32 for displaying selected items, such as artwork or the like. In alternate embodiments, the display area 32 can include multiple display areas, shelves, drawers, doors, or other selected features for the decorative furniture unit 14.

[0021] In one embodiment, the furniture unit 14 has full length side walls and a top wall that extend from the front side 22 into the corner 28. Figure 1B is a side elevation view of an alternate embodiment of the fireplace installation of Figure 1A. The front side 22 of the furniture unit 14 defines a front face extending along the upper and lower portions 18 and 20. The upper portion 18 has no side walls or top extending from the front side 22. Accordingly, the front side 22 along the upper portion forms a false front that receives the fireplace unit therein.

[0022] The lower portion 20 of the illustrated embodiment is a cabinet-like structure with a substantially horizontal support surface 31 extending from the front side 22. The support surface 31 is positioned so a portion of the fireplace unit 12 sits on and is supported by the support surface. In one embodiment, the furniture unit's lower portion 20 can have finished side walls that support the horizontal support surface 31. In other embodiments, the lower portion 20 does not have (or need) full side walls, and the horizontal support surface can be supported by vertical legs or fixtures that mount to the wall.

[0023] Figure 2 is a partial front elevation view of a direct vent fireplace unit 12 in an alternate furniture unit 34 in accordance with an alternate embodiment of the present invention. The furniture unit 34 in the illustrated embodiment is a tall, narrow, rectangular cabinet structure configured to be positioned along a flat portion of a wall. The furniture unit 34 of Figure 2 also has an upper portion 18 positioned above the ground (not shown) by a selected distance. The fireplace unit 12 is contained in the upper portion 18. In one embodiment, the fireplace unit

12 is positioned so the middle area of the fireplace unit is slightly below eye level of an average adult person standing in the room 24. Other embodiments can have the fireplace unit 12 at other heights above the floor.

[0024] While the furniture unit 14 of Figures 1A and 1B is a corner-mounted highboy-type structure, and the furniture unit 34 of Figure 2 is a tall, narrow decorative cabinet, other embodiments can include other styles of furniture units that receive the direct vent fireplace unit 12. As an example, the furniture unit 14 can be a bookcase, an entertainment center, an armoire, a cabinet, a hutch, a dresser, a storage area, a corner-mounted unit, a generally rectangular unit, a rounded or curved display unit, or the like. The furniture unit 14 can be constructed of a variety of materials, including, but not limited to, wood, pressboard, marble, stone, cement, metal, composite materials, or the like.

[0025] Figure 3 is an exploded, partial isometric view of the fireplace installation 10 of Figure 1. The furniture unit 14 of the illustrated embodiment has an enlarged receptacle 36 in the front side 22 of the furniture unit's upper portion 18. The receptacle 36 is shaped and sized to receive and contain the fireplace unit 12, so the fireplace unit is substantially surrounded and framed by the furniture unit 14. The furniture unit 14 can include a chimney passageway 38 sized to receive a direct vent chimney 40 that extends from the fireplace unit 12. In the illustrated embodiment, the direct vent chimney 40 includes an exhaust flue 41 concentrically arranged with an air intake flue 42. The direct vent chimney 40 is sealably connected to a flue adapter 44 on the top or back of the fireplace unit 12. In an alternate embodiment, the upper portion 18 of the furniture unit 14 can be configured to allow for two separate, non-concentric flues (e.g., the exhaust flue 41 and the air intake flue 42) to be connected to the top or back of the fireplace unit 12. The chimney passageway 38 and the direct vent chimney 40 of the illustrated embodiment extend toward the top of the furniture unit 14, although alternate embodiments can have the chimney passageway and the direct vent chimney extending out the back or side of the furniture unit 14.

[0026] The furniture unit 14 can also have a fuel gas passageway 46 therein that receives a gas line 48, which carries the fuel gas from the fuel gas source 16 to the fireplace unit 12. The fuel gas passageway 46 and the gas line 48 can be routed through the furniture unit 14 in a variety of locations to provide the necessary connection to the fireplace unit 12. In the embodiment shown in Figure 1B wherein the upper portion 18 has no sides or top, the gas line 18 connects directly to the fireplace unit 12 without having to actually extend through the furniture unit.

[0027] Figure 4 is an enlarged isometric view of the fireplace unit 12 shown removed from the furniture unit 14 of Figures 1A and 1B. As best seen in Figures 3 and 4, the fireplace unit 12 includes a contoured outer housing 50 that fits into the receptacle 36 in the furniture unit 14 (Figure 3). In the illustrated embodiment, the outer housing 50 is shaped with a generally triangular back portion to correspond to the corner-mounted configuration of the furniture unit 14 (Figure 3). In alternate embodiments, the outer housing 50 can have other shapes that correspond to the desired shape relative to the furniture unit 14.

[0028] The outer housing 50 has an interior area that contains a firebox 52. The firebox 52 is spaced apart from the outer housing 50 to define heat exchange passageways 54 between the firebox and the outer housing. The heat exchange passageways 54 are adapted to direct a flow of air around the firebox 52 so a flow of air moving from the room 24 through the fireplace unit 12 is heated before the air is blown out of the fireplace unit back into the room. The fireplace unit 12 can include a blower coupled to the heat exchange passageways 54 to facilitate the flow of air through the fireplace unit.

[0029] The firebox 52 contains a burner assembly 56, such as the Ember Fyre® burner assembly manufactured by Travis Industries Inc. of Kirkland, Washington. The burner assembly 56 is a contoured burner assembly that provides a simulated coal bed, which supports simulated logs and simulates a real wood burning fire, as is seen in Figure 1A. The firebox 52 also contains a thermally insulative, semi-dome-shaped surround 58 positioned adjacent to the burner assembly 56 so as to

partially extend around the burner assembly. This heat shield at least partially shields the sides and back of the firebox from the initial heat generated by burning fuel gas at the burner assembly 56.

[0030] Figure 5 is an enlarged cross-sectional view of the fireplace unit 12 taken substantially along lines 5-5 of Figure 4. Figure 6 is an enlarged isometric view of the surround 58 shown removed from the fireplace unit 12 of Figure 4. The illustrated surround 58 is a contoured, arcuate member having a semi-cylindrical body portion 60 integrally connected to a quarter-spherical top portion 62 that forms a partial dome-like top structure above the burner assembly 56. Accordingly, the contoured surround 58 defines a volume having a shape different from the shape of the interior of the firebox 52 (Figure 5). In the illustrated embodiment, the surround 58 is self-supporting and is removably contained in the firebox 52. The surround 58 is set flush onto the bottom of the firebox 52 around the burner assembly 56 without requiring additional mounting brackets or structures to hold the surround in place. In other embodiments, the surround 58 can be fastened or otherwise secured to the firebox 52 on burner assembly 56.

[0031] The front side of the surround 58 defines an arched opening that allows for visibility from the front of the fireplace unit 12 into the surround's interior area 59 and to the burner assembly 56. The surround 58 is shaped in size so that, when a person looks into the firebox 52, a decorative interior surface 64 of the surround 58 around the burner assembly 56 is visible, but side walls and back area of the firebox are blocked from view by the surround 58. The decorative interior surface 64 has a selected pattern or shape that can be any one of a variety of decorative designs. In the illustrated embodiment, the decorative interior surface 64 has a sculpted, shell-type appearance along the quarter-spherical top portion 62, and a smooth arcuate surface on the semi-cylindrical body portion 60. Alternate embodiments can have decorative interior surfaces 64 with designs that simulate bricks, tiles, or a variety of other decorative configurations. Other alternate embodiments can have a surround 58 with a shape different from the illustrated



semi-dome shape, while being self-supporting, so the surround stands up in the firebox 52 around the burner assembly 56.

[0032] In the illustrated embodiment, the surround 58 is made of a molded ceramic material capable of withstanding the significant heat generated by the burner assembly 56. In one embodiment, the surround 58 can be made of a material or composition of materials so the portions of the surround could change in color when a fire is burning in the firebox 52. Other embodiments can provide surrounds 58 made of other fire-resistant, thermally insulative materials.

[0033] As best seen in Figure 5, the contoured surround 58 is positioned between the burner assembly 56 and the sides and back of the firebox 52. The contoured surround 58 acts as a heat shield that directs heat forwardly toward the open front portion of the firebox 52. In the illustrated embodiment, the surround 58 acts as a baffle and has integral exhaust passageways 65 along the side portions that direct the hot exhaust gases from within the area of the surround back into the upper portion of the firebox 52 and to the exhaust flue 41 of the direct vent chimney 40. Accordingly, the surround 58 substantially increases the heat efficiency of the fireplace unit 12, and helps keep the back area of the firebox 52 and the backside of the outer housing 12 at cooler temperatures. These cooler temperatures allow the fireplace unit 12 to be mounted in the receptacle 36 of the furniture unit 14 (Figure 3) without requiring an excessive air space for safety purposes.

[0034] As best seen in Figures 3 and 4, the front of the firebox 52 is open to provide access into the firebox, such as for maintenance of the burner assembly 56. The open front of the firebox 52 is sealably covered by the glass 66 or the like that allows for viewing into the firebox when there is a fire burning in the firebox, such as at the burner assembly 56. A plurality of conventional controls 68 are mounted in the outer housing 50 below the firebox 52 that allows a user to control the burner assembly 56 for operation of the fireplace unit 12.

[0035] As best seen in Figures 1A, 1B and 3, the fireplace unit 12 has a decorative fireplace frame 70 mounted to the front side of the outer housing 50 (Figure 3) and around the receptacle 36 in the furniture unit 14. The frame 70 has an arcuate

opening 72 positioned adjacent to the glass that allows a person to look into the fireplace unit 12 when a fire is burning in the firebox 52 to see the decorative interior surface 64 of the surround 58, the burner assembly 56, and the fire. In the illustrated embodiment, the outer housing 50, the surround 58, and the frame 70 have a "portrait" shape, wherein the height dimensions are greater than the width dimensions. As a result, the tall, thin fireplace unit 12 provides an aesthetically proportioned shape relative to the selected furniture unit 14 to provide a very handsome fireplace installation 10. Other embodiments can include the outer housing 50, the surround 58 and the frame 70 having a "landscape" shape that provides a proportional shape relative to selected fireplace installation configurations.

[0036] In one embodiment, the glass 66 has a reflective characteristic, such as a half-silvered coating, that forms a one-way mirror. Accordingly, when there is no fire within the fireplace unit 12 and the light in the room 24 (Figure 1A) is brighter than the light in the firebox 52, the glass 66 provides a mirror-type reflection when looking at it from outside the firebox (e.g., from the room). When the burner assembly 56 is activated and a fire is started within the firebox 52, the light from within the firebox is greater than the light outside of the fireplace unit 12, so that a person can see the fire through the glass instead of seeing the reflection.

[0037] Figure 7 is an isometric view of a wall-mounted fireplace installation 74 in accordance with an alternate embodiment of the invention. This installation 74 includes a wall 76 having an enlarged receptacle 78 formed therein that receives the fireplace unit 12. In the illustrated embodiment, the direct vent chimney 40 is shaped and sized to extend through or within the wall 76 so as to communicate with outside air. The receptacle 78 is positioned well above the floor 80 and is positioned at a location remote from and not surrounded by a conventional mantle of a fireplace. In one embodiment, the receptacle 78 and the fireplace unit 12 are positioned so that the middle of the firebox is roughly at eye level for an average adult standing up.

[0038] In the illustrated embodiment, the outer housing 50 of the fireplace unit 12 and the glass 66 are generally flush with the wall 76, and the frame 70 is mounted against the wall, thereby providing the decorative frame around the glass 66 and firebox 52, respectively. The glass 66 can be transparent or it can be a one-way mirror, as discussed above. When the glass 66 is a one-way mirror, the frame 70 can have an appearance of being a decorative mirror frame.

[0039] Use of a one-way mirror to cover the open front of the firebox 52, as described above, is applicable not only to gas-burning, direct vent fireplace installations, but to other types of wood, pellet, or gas-burning fireplace assemblies.

[0040] As best seen in Figure 3, the fireplace unit can be a wood or gas-burning direct vent fireplace insert, fireplace, or a free standing stove. The fireplace assembly can be mounted or installed in a conventional manner in a room, or in a selected furniture unit as discussed above. The outer housing 50 or other type of fireplace housing has an opening in communication with the firebox 52 or other fire containment area, and the opening is covered by one or more pieces of glass 66 or other type of cover panels. In one embodiment, the cover panel is a tempered, high temperature-resistant glass. In another embodiment, the cover panel is a door or multiple doors that contain one or more panels that provide selected visibility into the fire containment area.

[0041] The glass 66 or cover panel is configured to allow a person to see into the firebox 52 or other fire containment area when a fire is burning therein, but to substantially block the person's view into the fire containment area, such as by providing a reflection, when a fire is not burning. In one embodiment, the cover panel has a first transmittance of light therethrough in a first direction and a second transmittance of light therethrough in a second direction. The second transmittance of light is greater than the first transmittance of light, such that a higher percentage of the light traveling in the second direction can travel through the cover panel than is allowed to travel through the cover panel in the first direction. The percentages are based on the amount of light present on one side

of the cover panel compared to the amount of that light that travels through the cover panel and comes out on the other side.

[0042] In one aspect of this invention, light traveling in the first direction travels from an area exterior to the outer housing 50 or other type of fireplace housing inwardly through the cover panel into the firebox 52. Light traveling in the second direction travels from within the fire containment area outwardly through the cover panel to the area exterior to the fireplace housing. When the difference in transmittance in the first and second directions is sufficient, the cover panel can prevent the person from seeing into the firebox 52 when there is no fire burning in the fire containment area and can allow the person to see through the cover panel into the firebox 52 when a fire is burning.

[0043] In one embodiment, the glass 66 or cover panel is a one-way mirror oriented with a reflective surface facing outwardly. Accordingly, a person in the room looking at the cover panel will see a reflection from the cover panel when no fire is burning in the firebox 52 and when the intensity or amount of light in the room is greater than the intensity or amount of light from within the fire containment area. But, when there is a fire in the firebox 52 and the intensity or amount of light from within the fire containment area is greater than the intensity or amount of light in the room, then the person can clearly see through the one-way mirror into the firebox 52 to view the fire. In this embodiment, the cover panel is one or more glass panels having the half-silvered coating on each panel. In yet another aspects of the invention, other materials can be used, including coatings and multiple layers or laminates, to provide the one-way mirror effect.

[0044] In an alternate embodiment, the glass 66 or other cover panel can be a laminated structure with various layers of selected materials being used to provide the first and second transmittances of light. Multiple layers may be bonded together, held in contact with each other, or be configured such that there is a space between at least a portion of one or more layers.

[0045] In another embodiment, a coating, such as a half-silvered layer, covering a portion of the cover panel can be used to provide the first and second

transmittances of light. Alternately, various layers of selected materials and coatings can be used in combination to achieve the first and second transmittances of light. Accordingly, the cover panel can have one or more selected portions of it configured as a one-way mirror, and the other portions fully transparent, tinted, or even opaque.

[0046] In yet another embodiment, the glass 66 or cover panel can be configured to have an adjustable visibility characteristic between a first visibility that substantially prevents a person from clearly seeing into the firebox 52 or other fire containment area, and a second visibility that allows the person to see into the fire containment area with selected increased clarity. For example, the cover panel can be configured to have a fully reflective or substantially opaque characteristic when no fire is burning in the firebox 52, and a virtually transparent, tinted, or translucent configuration when the fire is burning. In one aspect of the invention, a thermally sensitive coating or combination of coatings on portions of the cover panel can provide increased visibility through the cover panel when exposed to heat and can provide decreased visibility after cooling.

[0047] With any of the above embodiments, the glass 66 or cover panel can have many and varied configurations. For example, the cover panel can be securely fastened to the fireplace unit 12 or other type of fireplace assembly over the opening, or the cover panel can be quickly removable from the fireplace assembly. In another aspect of the invention, the cover panel can be attached to an exterior housing, such as the furniture unit 14 in Figure 3. In yet another aspect of the invention, the cover panel can be surrounded by a decorative frame 70 as shown in Figures 3 and 7. In still another aspect, the cover panel can be one or more doors that can be opened to allow access to the interior of the firebox 52. Additionally, the cover panel can include multiple panels wherein each panel has a selected visibility characteristic with the different first and second transmittances. Multiple cover panels may be used to cover multiple openings in the fireplace housing.

[0048] Figures 8 and 9 are isometric views of a fireplace assembly in accordance with an alternate embodiment. The illustrated fireplace assembly is a freestanding stove 100 with multiple cover panels covering multiple openings in the fireplace housing with two cover panels configured as doors in accordance with one embodiment of the present invention. As best seen in Figure 8, the stove 100 has a fire burning in the fire containment area, and the components and the fire are readily visible through the cover panel to a person exterior to the fireplace assembly. As best seen in Figure 9, the stove does not have a fire burning in the fire containment area, such that a person looking at the fireplace assembly sees the cover panel as a mirrored surface.

[0049] The above description of illustrated embodiments of the invention is not intended to be exhaustive or to limit the invention to the precise form disclosed. While specific embodiments of, and examples for, the invention are described herein for illustrative purposes, various equivalent modifications are possible within the scope of the invention, as those skilled in the relevant art will recognize. The teachings of the invention provided herein can be applied to other direct vent fireplace installations, not necessarily the particular installations described above.

[0050] While certain aspects of the invention are presented below in certain claim forms, the inventor contemplates the various aspects of the invention in any number of claim forms. In general, in the following claims, the terms used should not be construed to limit the invention to the specific embodiments disclosed in the specification and claims, but should be construed to include all components and methods of manufacturing the components in accordance with the claims. Accordingly, the invention is not limited by the disclosure, but instead the scope of the invention is to be determined entirely by the claims.

[0051] From the foregoing, it will be appreciated that specific embodiments of the invention have been described herein for purposes of illustration, but that various modifications may be made without deviating from the spirit and scope of the invention. Accordingly, the invention is not limited except as by the appended claims.